





AN

EXPERIMENTAL DISSERTATION

ON THE

CHEMICAL AND MEDICAL PROPERTIES

OF THE

Nicotiana Tabacum

OF

L I N N Æ U S,

*COMMONLY KNOWN BY THE NAME OF**TOBACCO.*

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AND CHEMICAL SOCIETIES OF PHILADELPHIA.

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1799.

To

Major Pierce Butler

with the best wishes of his friend

the

Author.

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AN
INAUGURAL DISSERTATION,
SUBMITTED TO
THE EXAMINATION
OF THE
REV. JOHN EWING, S. T. P. PROVOST;
THE
TRUSTEES AND MEDICAL PROFESSORS
OF THE
UNIVERSITY OF PENNSYLVANIA,
FOR THE DEGREE OF
DOCTOR OF MEDICINE,
ON THE SIXTH DAY OF JUNE, 1799.

TO
ALEXANDER BARON, M. D.
OF
CHARLESTON, SOUTH-CAROLINA.

PERMIT me, kind Sir, thus publicly to avow my acknowledgments for the many civilities I have hitherto received from you and your amiable family, when under your tuition: a period that I ever reflect on with the warmest glow of pleasure: and accept my assurances, that in every stage of life, I shall preserve that friendship and grateful remembrance of your judicious council, which you have inspired by your attentive concern for my welfare, and which shall never be erased from the mind of

Your affectionate Friend

And PUPIL,

EDWARD BRAILSFORD.

TO
SAMUEL WILSON, M. D.
OF
CHARLESTON, SOUTH-CAROLINA.

DEAR SIR,

I EMBRACE this opportunity, of avowing the lively sense I entertain of your amicable disposition towards me, when under your immediate care, and assure you in the language of truth, that a grateful recollection of your friendly admonitions will ever warm the breast of

Your affectionate Pupil,

EDWARD BRAILSFORD.

TO
JAMES WOODHOUSE, M. D.
PROFESSOR OF CHEMISTRY
IN THE
UNIVERSITY OF PENNSYLVANIA.

SIR,

ALLOW me to adopt this mode of expressing my acknowledgment, for the many testimonies of friendship I have experienced from you, and suffer me at the same time to declare that a grateful remembrance of the many favors you have conferred, will ever be retained by

Your affectionate Friend,
EDWARD BRAILSFORD.

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EXPLANATION OF THE PLATE.

A. A branch of the tobacco plant.

B. An interior view of its blossom.

C. A posterior view of its blossom.

Fig. 1. Represents a seed vessel in a state of maturity.

Fig. 2. A transverse section of a seed vessel, which exhibits the distribution of the seeds.

Fig. 3. A longitudinal section of a seed vessel.

Fig. 4. A calix, with the five stamina and the pistillum.

Fig. 5. Represents a longitudinal section of a blossom, which shews its internal structure.

Fig. 6. A species of phalœna, or butter-fly, very common on the blossoms of the tobacco.

Fig. 7. The tobacco worm.

Fig. 8. The root and some of the inferior leaves.

I N T R O D U C T I O N .

WHEN we explore the extensive regions of the globe, and contemplate the many plants which the beneficent disposer of all things has given as useful ornaments to the earth, and at the same time reflect that through the ignorance or indolence of man, many of those valuable subjects are permitted to wither in our fields or forests, without ever attracting the attention of those mortals, for the alleviation of whose corporeal infirmities they were indubitably intended, many unpleasant ideas must naturally intrude themselves on our minds—Regret is awakened in our breasts at the inactivity of our ancestors, whose unpardonable sloth has suffered diseases to exist as *opprobria medicinæ* for the relief of which many plants incontestibly flourish, and which from inattention or some other omission equally culpable, die neglected, and answer no valuable purpose but to fertilize the soil which gave them birth.

The free inhabitants of the United States of America, would merit additional censure were they to evince a similar supineness. Possessed of pre-eminent advantages for rendering valuable acquisitions to the *Materia Medica*, their neglect of such pursuits would prove a national disgrace, and be considered by their posterity equally criminal as the most heinous offence against civil government.

Inhabiting a vast extent of territory, it would be arraigning divine goodness, not to suppose, that he has bestowed with a liberal hand, sources of alleviation to those miseries, which were incurred by the loss of our primeval innocence.

It has been justly observed by a very learned author,* that, “the strength of a state is not to be computed by extent of country, but by the number of its citizens, and the utility of their labour.” This should actuate us in the pursuit of useful knowledge, so as to render the extent of country which we inhabit more useful and more wealthy, whereby, not only our literary character as a nation, but also our liberty and independence will be effectually established.

That there are plants diffused all over the great continent of America, endued with the most active medical virtues, is incontrovertible ; but to use the words of the poet,

“ Full many a flower is born to blush unseen,
“ And waste its sweetness on the desert air.”

The industry and wisdom of man are now the only requisites to develop those virtues, and render them beneficial to mankind.

To the honour of our infant republic, the science of medicine has been laudably promoted by the invaluable acquisitions of the professor of botany and materia medica in the university of Pennsylvania, with a view to cultivate an intimate acquaintance with the indigenous plants of this country.—The literary fame of this gentleman is too well known to require any eulogy from my pen; he has with as much ingenuity as industry, paved the way to facilitate the future researches of men of science, and in language peculiarly pleasing and descriptive, has given an agreeable animation to useful facts, so as to render them not only grateful to the reader, but also truly beneficial and interesting.

Were candidates for medical honours to pursue this laudable example of their preceptor, they would enrich the

* Rollin's Arts and Sciences.

Materia Medica with many valuable articles; but, unfortunately for this branch of science, a depraved predilection for the thread worn subject of diseases, tempts them to launch their bark into the dangerous sea of controversy, and frequently without the necessary implements for the effectual execution of such an undertaking.

Attracted by the ostentatious glare of hypothetical reasoning, they frequently adopt with avidity theories the most extravagant and fallacious, and without examining the solidity of the opinions they embrace, confide entirely to the judgment of others, and with the greatest temerity risque their reputation on that unsubstantial basis.

When philosophy shall be esteemed an indispensable appendage to the medical character, then shall such inconveniences cease to exist. The susceptible mind of man, enlightened by the rays of philosophy, will then dissipate the clouds of ignorance, and experimental enquiries shall then be cherished as the surest vehicles to truth.

I have been prompted to adopt the subject of Nicotiana, not from any vain idea of my ability to do ample justice to the medical qualities of this plant, but from an anxious solicitude to contribute my mite towards the promotion of one of the most useful branches of science, and I trust that from this consideration, my experiments and opinions will be examined with an eye of lenity, but, at the same time, with candour and impartiality. I have to regret extremely, that a serious indisposition, for near two months, unfortunately precluded my entering as minutely into the analysis of Tobacco, as I at first contemplated; but I have endeavoured to atone for this deficiency, by attending par-

ticularly to its influence on the system, and also to the respective operations of its constituent parts.

The exhibition of *Nicotiana*, as a medicine, for the mitigation of many diseases to which mankind are incident, has been unfortunately but little attended to by physicians.

The deleterious effects with which it is endowed, and the supposed danger of exhibiting it on this account, have led medical characters to depreciate the worth of a medicine, whose benign influence, by a judicious administration, in eradicating certain diseases, has, in many instances, been evidently confirmed.

It has been declared, by some superficial observers, to be useless, from the repeated proofs of its inefficacy in mitigating the violence of those diseases, in which, many more accurate inquirers have asserted it proved beneficial. Others have alledged, that the baneful powers, with which it is replete, dissuade from an use of it. In consequence of these chimerical assertions, a medicine which would prove a valuable acquisition to the *Materia Medica*, has been almost entirely expunged from modern practice.

If we were to admit such injudicious opinions to govern our reason, in selecting medical plants, how few would be the number which would engage the attention of the timid and injudicious practitioner ! for in the hands of such only are powerful medicines rendered injurious, and in the hands of such also the most lenient prove obnoxious. The invaluable aphorism of Dr. Withering, therefore, merits the attention of every practitioner of medicine ; he justly observes, that, “ poisons in small doses are the best medicines, and the best medicines in too large doses are poisonous.”

It would be as inconsistent to stigmatize this plant with the appellation of poison, as it would be to pronounce a crum of bread noxious in its quality, because it has in some cases entered the trachea, and occasioned instantaneous death.

The conclusions which I have formed on the subject which constitutes the subsequent pages of this dissertation have been founded on experiments, and those experiments, though few, have been conducted with accuracy. They have been mutually the sources of much mental disquietude, and the diffidence I now feel in submitting them to the scrutiny of the learned, tends considerably to augment the disagreeable emotions which, at this time, disturb my tranquility : however, I shall consider myself richly compensated for every inconvenience, should any word or thought contained in these pages prove propitious in exciting some more accurate observer to a more minute investigation of this copious subject.

NATURAL HISTORY.

CHAPTER I.

The natural history of Tobacco, and of its first introduction as an article of luxury.

WE have accounts, in different authors of several species and varieties of this plant, but as an accurate description of them may be acquired in almost every botanical book, it would be altogether useless for me to enter into an elaborate definition of each in particular. I shall therefore confine myself to that species which is thus designated by the great Linnæus, "*Nicotiana Tabacum: foliis lanceolatis sessilibus decurrentibus, floribus acutis.*"

It is termed by Caspar Bauhin, *Nicotiana major latifolia*. According to the natural method of Linnæus, it belongs to the 28th order, called *Luridæ*. Among the aborigines of the continent of America, it was distinguished by the appellation of *pætum*, whilst those who inhabited the islands, called it *yoli**.

According to Sir Hans Sloane†, its original name was *picielt*, but was termed *tobacco* by the Spaniards, from the circumstance of its being brought from the island of *Tobago*, where it grew almost spontaneously.

Tobacco was first introduced into Europe in the year 1559 by John Nicot, lord of Villemain, who was agent

* Encyclopedia.

† Sir Hans Sloane's Natural History of Jamaica.

in Portugal for the King of France, from whence he brought the plant, and presented it to the Queen : from this circumstance it was called *Herba Regina*, and in honor of him *Nicotiana**.

Lobel and others accounted this, as well as the other species of *Nicotiana*, an *Hyosciamus*†, and called it *Hyosciamus luteus* and *dubius*, in consequence of which some have given it the English name of *yellow Henbane*. It is arranged by Linnæus in his fifth class, *Pentandria Monogynia* the *stamina* consisting of five *subulated filaments*, topped with oblong *antheræ*; the *style* rises from the rudiment of the fruit single. The flowers are large and of a beautiful red, and annexed to long and slender foot-stalks : they are of a *monopetalous tubelous* form, and grow on the tops of the branches, and of the main stalk ; the tube is longer than the cup, and the limb which spreads open is divided into five acute-pointed segments.

The *capsule* which succeeds the flower is bivalved and bilocular, is also large, and of an oval form : it opens longitudinally, and sheds extremely minute seeds, but very numerous.

The root is divided into many parts, grows very thick and long, and is furnished with an infinity of small fibres. The growth of this plant is generally from five to six feet in height, but sometimes more, depending upon the season, and fecundity of the soil. The stalk is substantial, round, very erect, and divided into branches. The leaves are large, numerous, and distributed in an alternate manner :

* *Theatrum Botanicum*, page 711.

† *Theatrum Botanicum*.

they are of a deep green, and have petioli, or foot-stalks, but surround the common stalk, in great part at their base.

Tobacco is a native of America, and was first sent to Spain and different parts of Europe, for the purpose of ornamenting their gardens, but so great was the demand for the dried leaves, that it at length became an article of commerce, and is at this present period almost universally resorted to as a *luxury*.

The Indians formerly made use of it as a *vulnerable*, and ascribed many virtues to it as a medicine. They entertain an idea, that tobacco was brought them down from the heavens by the Great Spirit, who descended for the express purpose of presenting them with this plant, in order that it might be spread throughout the land for the benefit of their species. Hence many nations of that tribe, make use of it in certain forms of their religion:—It is called by them *Eche*.

Travellers assert, that they often resort to the *great mountain*, where the angel appeared, and do homage to that spot, on which their ancestors first received so divine a plant.

It is alledged by Sir Hans Sloane,* “that the priests of Espaniola, called *Bobitis*, who are medical characters as well as theologists, make a practice of chewing and smoking tobacco, until they become perfectly inebriated, and in this situation they perform many gesticulations, pretending likewise to recount for the will of God, what they have seen.” They feign also to perfect radical cures among many of the diseased, and so prejudiced are the people in their favour, as to imagine themselves perfectly relieved. The form

* Sir Hans Sloane’s natural history of Jamaica.

which they observe on this occasion, as related by Sir Hans Sloane, is in the following singular manner; “when they attempt to cure, they shut themselves up with the sick, surround him, smoking him with the same; suck out of his shoulders what they say was his disease, shewing a stone or bone they kept in their mouths, which the women keep as relicks, thinking they facilitate birth.”

Thevet affirms that the women among the Aborigines of America were led away with an idea, that indulging in the use of tobacco was not only injurious to the body, but that it also prevented *conception*, and tended greatly to diminish the *venereal appetite*; in consequence of which, they forbore the use of it in any form whatever.

The Portuguese attributed many virtues to this plant, and pronounced it a powerful *counterpoison*; hence they have given it the appellation of *Herba Santa*.

Sir Richard Greenfield, on his discovery of Virginia in 1585, observed that the Indians made great use of tobacco in clay pipes, for the preservation of their health. Pleas'd with the novelty of the circumstance, he took several of the pipes with him on his return to England, which were introduced into court: others were made agreeable to their construction, and from that period the use of smoking soon became general.

It was first introduced among the Oriental nations by the Dutch* seamen, who used to carry pipes about them made of palm leaves, in which they smoked to ease their weariness, as well as suspend a disposition for food.

* Sir Hans Sloane.

The Indians after having gathered their crop of tobacco, hang it up in their houses for the purpose of curing, after this is perfected, they take four or five leaves, and wrap them up in the great leaf of a tree, in the form of a funnel; they then apply fire to the extremity, and inhale the smoke, which being frequently repeated, causes them to subsist three or four days*, without partaking of any aliment. They practise this more particularly, when they contemplate going to war, or are about to predict the termination of future important events. It is considered by them as the most valuable offering that can be made to the beings that they worship. They use it in all their civil and religious ceremonies. When once the spiral wreaths of its smoke ascend from the feathered pipe of peace, the compact that has been just made, is considered as sacred and inviolable. Likewise when they address their Great Father, or his guardian spirits, residing, as they believe, in every extraordinary production of nature, they make liberal offerings to them of this valuable plant, not doubting but that they are thus secured of protection†.

* It is universally acknowledged that tobacco does not impart any degree of nourishment to the body, but on the contrary tends greatly to reduce obesity; yet such is its stimulating quality, that it supports the system for several days successively, above what may be termed the *hungry point*. This is taken notice of by Mr. Kerr†, with respect to opium. “The eastern nations,” says this author, “are so well convinced, by experience, of its powers in diminishing the appetite, that in the famine which prevailed in the East-Indies, in the year 1770, the wretched sufferers purchased it at exorbitant prices, to allay the cravings of hunger, and smooth the approach to death.”

† *Kerr. Lond. Med. Obser.* vol. v. art. 28.

‡ See *Encyclopedia*.

CHAPTER II.

A concise account of the influence of Tobacco, on living systems, illustrated by a few experiments.

That tobacco is both a powerful emetic and cathartic, when exhibited in any form whatever, is generally admitted: we find that all authors, who have written on its effects, have unanimously concurred in this opinion; some have also subscribed to its being efficacious in promoting the renal discharge; but with respect to its *sedative* or *stimulating* effects on the living system, various opinions have hitherto existed.

Notwithstanding the sagacity and experience of Doctor Fowler in many respects, the influence of Nicotiana on the human system, in regard to its stimulating quality, entirely escaped his attention.

After drawing several inferences, relative to the operation of this medicine, in a concluding part of his work*, he observes, that it possesses a sedative quality†, and frequently proves laxative: on this account he supposes that

* Fowler on Dropsy.

† A similar opinion was formerly entertained of opium; but the ingenious experiments of Doctor Crumpe, must sufficiently demonstrate, to every unprejudiced mind, the *stimulating quality* of that medicine; and that its *supposed sedative effects*, are solely to be attributed to a secondary operation, or *indirect debility* induced by its immense stimulating property, when disproportioned to the *excitability* of the system.

it may prove salutary in many painful cases, where costiveness may render opiates exceptionable.

That it is a laxative, I have almost uniformly observed, but with respect to its being endued with a sedative quality the subsequent experiments will greatly invalidate.

It is not my intention or wish to enter into the field of controversy on this head, and therefore I have attempted to define by experiments, the unequivocal operation of this plant. It is unquestionably the most substantial basis on which we can found our arguments, and to such we must ultimately appeal for the attainment of truth.

The stimulating effects of tobacco did not escape the discerning eye of Doctor Cullen, whose opinions should ever be viewed with veneration and respect.

In treating of this plant, he observes, that "the infusion of tobacco when it is carried into the blood vessels, has sometimes shewn its stimulating powers exerted in the kidneys; and very lately we have had it recommended to us as a powerful diuretic of great service in dropsy‡."

That tobacco promotes the *renal* discharge, is beyond a point of controversy. Every practitioner of medicine who has ever had occasion to administer it, either in the form of infusion or substance, must have observed its *diuretic* influence on the system.

‡ Cullen's *Materia Medica*, page 191.

This is sufficiently exemplified in the work of Doctor Fowler*, to whom we are greatly indebted for the series of experiments enumerated by him. He has clearly demonstrated the influence of tobacco in promoting the urinary secretion, and has as perspicuously evinced the utility of its exhibition in violent cases of Ascites, Anasarca, and Dysury.

Without a further disquisition relative to the operation of tobacco on the human system, I shall proceed with enumerating my experiments, and will leave it to the candid reader to judge how far they may merit his attention; they deserve at least the credit of being faithfully related.

E X P E R I M E N T I.

In order to ascertain the particular operation of tobacco, with respect to its influence on the pulse, I took three hours after breakfasting on toast and coffee, forty drops of a strong decoction of tobacco† in a little water. My pulse beat seventy strokes in a minute. The following table manifests the stimulating quality of this plant, as I have particularly specified the number of pulsations at the expiration of every 5th. minute.

In	5	10	15	20	25	30	35	40	45	50	55	60	Min.
P. beat	72	75	75	77	80	84	84	81	76	72	70	70	

* See Fowler on Dropsy, page 72, where he observes that out of one hundred and fifteen cases in which he administered tobacco, in ninety-three of them it proved diuretic.

† Two drachms of the dried leaves of tobacco were put into four ounces of water, and boiled down to two.

For the first five minutes there was an aromatic warmth diffused all over my throat, which soon extended itself to my stomach, and continued thus for the first quarter of an hour. In fifteen minutes I experienced a little nausea, which was promoted on the twenty-fifth minute; on the thirtieth minute my pulse was greatly increased, both in tension and frequency; a considerable moisture appeared on my forehead, and a slight degree of dizziness attended, which continued until near the fortieth minute.

On the forty-fifth minute, the symptoms abated, and my pulse was diminished both in fulness and frequency. At the expiration of the hour, I felt a kind of languor, and my pulse was reduced to its natural standard.

Soon after every inconvenience disappeared, and I dined with my usual appetite.

E X P E R I M E N T 2.

On the same evening, two hours after eating a little bread and milk, I took forty drops of a strong infusion* of the dried leaves of tobacco; my pulse beating sixty-eight strokes in a minute, its natural standard.

In	5 10 15 20 25 30 35 40	Min.
P. beat	70 73 74 76 80 83 83 81	

In	45 50 55 60 65 70 75	Min.
P. beat	79 75 71 70 70 68 68	

* Two drachms of the dried leaves of tobacco were infused in two ounces of water, for 24 hours, and then strained off.

Immediately after swallowing the draught, I felt an evident sensation of warmth throughout my throat, which was soon communicated to my stomach, and continued to increase for fifteen minutes, but gradually diminished at the expiration of the twentieth minute: I now experienced some degree of nausea, which continued to increase until the twenty-fifth minute; it produced a considerable moisture on my forehead, and in the palms of my hands, but no vomiting attended. On the thirtieth minute, my pulse became tense, frequent and quick, but the perspiration and nausea began to subside on the thirty-fifth minute; throughout the remaining part of the hour, my pulse was diminished considerably in regard to fulness, and when one hour and fifteen minutes had elapsed, it resorted to its former state; I discharged that night an unusual quantity of urine, and had two copious discharges downwards.

E X P E R I M E N T 3.

I gave to Peter Vallet, a robust healthy lad of about nineteen years of age, thirty drops of the tobacco infusion,* in a little water; he was not accustomed to the use of tobacco in any form whatever.

His pulse beat seventy, previous to his taking the draught.

In	5	10	15	20	25	30	35	40	45	50	55	60	min.
P. beat	72	76	78	79	80	78	74	73	68	70	70	70	

* Similar to that exhibited in the preceding experiment.

When ten minutes had elapsed, he complained of a considerable warmth in his stomach. In fifteen minutes he said that he was a little giddy and somewhat exhilarated. In twenty he observed that he felt a little sick, and that the room appeared to him to be turning round, as he expressed himself; his face was much flushed, and on the thirtieth minute, he complained of a tremor in his hands. In forty-five minutes the affection of his head and nausea abated, but the tremulous motion still existed. At the expiration of an hour he felt as usual, excepting a slight degree of nausea, and a kind of languor throughout his frame. In one hour and a half, he ejected the contents of his stomach, and had two large evacuations downwards.

E X P E R I M E N T 4.

About two hours after partaking of a light supper, I finished, for the first time, the smoking of a segar; my pulse beat seventy strokes in a minute, and I felt uncommonly disposed to sleep. Recollecting the powerful effects of smoking, but a few minutes, on a former occasion, I wished now to ascertain its operation on the system, and its particular influence over the pulse, the results of this experiment were as follow:

In	5 10 15 20 25 30 35 40	Min.
P. beat	75 77 81 85 90 100 104 102	

In	45 50 55 60 65 70 75	Min.
P. beat	93 85 77 70 67 70 70	

For the first five minutes, I experienced no evident effects; the pulse raised only five. At the tenth and fifteenth minutes I had frequent eructations, and all inclination for

sleep was totally dispelled. At the twentieth minute my head felt light, my spirits were much elated*, and my pulse more full, frequent, and quick.

I continued smoking without cessation, until the twenty-fifth minute, when I perceived a considerable nausea at my stomach, and an evident moisture on my forehead, accompanied with repeated eructations.

I now vomited very profusely, and on the thirtieth minute my pulse became frequent and low. Every thing appeared in a circuitous motion, and I was compelled to seek relief from my pillow for a few moments, until relieved of this dizziness. On the thirty-fifth minute the vomiting was repeated, and I took a draught of cold water, which mitigated every symptom. I felt so much relieved, that I got up and walked across the room. I experienced at the fortieth minute a tremulous affection of my hands, and a giddiness and pain in my head; so much so, that I was compelled to lie down again: the former of these affections continued for near two hours, but the latter was somewhat abated, after being in a recumbent posture for a few moments. My pulse still continued depressed, frequent, and quick; at the sixty-fifth minute my thirst was urgent, my pulse diminished three, still languid, and head-ach increased. I then drank a glass of water, and in seventy-five minutes, my pulse was restored to its natural state, but the pain in my head still continued.

From the preceding experiments we may infer, that the *primary* effects of tobacco, are to accelerate the pulse,

* Doctor Grumpe observed this to be the constant effect of opium.

and elevate the spirits ; and that its secondary operation is to depress the former, and subdue the latter : for it is to be uniformly observed in the preceding, as well as many of the subsequent experiments, that, after the first half hour had elapsed, the number of pulsations, in a given time, continued to diminish, until reduced to, and frequently below †, the natural standard of health. Doctor Cullen ‡, in speaking of the *commotion* generated in the system, from the exhibition of narcotics, observes, that to explain this operation, “ it seems necessary to assign some other cause than the direct stimulant power of the substance applied ; and it appears to be that resistance and consequent activity, which the animal œconomy is suited to oppose to every application that has a tendency to hurt it. This power is well known in the schools of physic, under the title of the *Vis Conservatrix et Medicatrix naturæ* ; which however difficult to explain, must, as a general law of the animal œconomy, be admitted as a matter of fact.”

In contemplating the sentiments of Doctor Cullen on this head, we must pay homage to his great ingenuity, but at the same time, must not allow our veneration for the abilities of this illustrious physician, to operate as a barrier to the admission of truth.

We know that the system appears perfectly tranquil when in the enjoyment of health, and that this depends up-

† This gave origin to the *supposed sedative effects* of opium. Physicians were not aware of its *instantaneous* operation on the system, and on this account attended solely to the *effects produced*, after its *primary* influence had subsided.

‡ Cullen's *Materia Medica*, vol. 2. page 151.

on a just ratio of *excitement* and *excitability*; but when either predominate, disease is invariably the consequence. As this is admitted, would it not be more just to suppose, that this disorganization of the human frame, depends upon the stimuli applied, being *disproportioned* to the *excitability* of the system?

Do we not see similar commotions generated in persons, on the immediate application of *heat*, after exposing themselves to intense *cold*, and thereby rendering their systems extremely *excitable*? And may not the same be extended to *narcotics*, when disproportioned to the *excitability* of the system?

With respect to the operation of tobacco on the mind, in producing hilarity, we see it sufficiently exemplified in many who have recourse to it in a certain degree.*

Most of the ancient authors who have written on this subject, avail themselves of an opportunity to mention the exhilarating effects of tobacco; and Sir Hans Sloane in particular observes, that, “in all places where it has come, it has very much bewitched the inhabitants, from the more polite Europeans, to the barbarous Hottentots.”

We find also that the like effects of this noxious plant, are specified in Cortes's conquest of Mexico, where this

* A gentleman of this city informed me, that the smoking of two or three segars, seldom failed of occasioning an evident degree of alertness for a few moments after; but if he carried the smoking to a greater extent, it generally produced a nausea, and a giddiness in his head.

author affirms, that Montezumo, or the Emperor, drank several sorts of liquor, richly perfumed with salutiferous herbs; after his meals, he took a kind of chocolate, and smoked tobacco perfumed with liquid amber. The juice of this plant was one of the ingredients with which the priests intoxicated themselves, whenever they were obliged to deliver an oracular answer.

Three or four buffoons generally attended at the table, for the purpose of diverting the Emperor, with their ludicrous talents.*

These were the customs of the Indian tribes, and these also were the amusements of many civilized nations.—It is to be much lamented, that even at this present enlightened period, the manners of the most civilized nations, in this respect, partake of those of the savage. But to use the words of a much celebrated and esteemed author, † “it would seem as if liberty and indolence were the highest pursuits of man; and these are enjoyed in their greatest perfection by savages, or in the practice of customs which resemble those of savages.”

We find that its indiscriminate use as a luxury not unfrequently proves injurious. “Its *narcotic fumes*,” says Dr. Leake, “will stupify the brain, and *deaden the invigorating power of the nerves upon the whole bodily system*. The propensity of persons to the use of this noxious plant, after being once habituated to the impression of its stimulus, is equally prevalent with that of dram-drinkers, to spi-

* Hernando Cortes's conquest of Mexico. page 274.

† Rush. See his medical observations, vol. 1. p. 11.

rituous liquors, without which, however pernicious, they become languid, and debilitated, and are affected with nervous tremor.”*

As I shall have occasion to speak more particularly of its baneful influence in a subsequent part of this work, when treating of its noxious effects in smoking, snuffing, and chewing, I shall for the present suspend my opinions on this head.

Notwithstanding the deleterious effects of tobacco hitherto enumerated, its operation as a medicine frequently proves salutary; this has been clearly demonstrated in many violent cases of obstinate disease, and as such it is to be held in the highest estimation. Its influence on the system is immense. It is beneficial in some diseases from its *diuretic quality*; in others as a *sudorific*, and it proves in proper doses, a *gentle emetic*, and a *lenient purgative*: hence the propriety of its use in many other diseases. But more of this hereafter.

Having now enumerated its respective operations on the human system, I shall proceed with relating some experiments which were made on living systems, both internally as well as externally.—

E X P E R I M E N T 5.

I dropped a small portion of the expressed juice into my right eye, which immediately imparted an excruciating pain, attended with a burning diffusible heat, somewhat analogous to the introduction of an aqueous solution of opi-

* See Leake's practical Essays on diseases of the viscera, p. 72.

um :* This sensation continued to increase for the space of thirty minutes, but gradually diminished after this time; and totally subsided at the expiration of one hour, leaving the part extremely sore and disagreeable, and somewhat blood-shot, for the remaining part of that day.—

E X P E R I M E N T 6.

After boiling a large quantity of the leaves, in order to procure an extract, I frequently expressed with my hands the liquor which the leaves absorbed, which occasioned such a degree of nausea at my stomach, as almost to induce vomiting: † the sensation continued for some time, but gradually diminished, as the application was not again renewed.— This was succeeded by a flushing of my face, a considerable pain in my head, a throbbing of my temples, a languor with diminution of appetite, and a disposition to sleep.

In order to satisfy my readers that this effect on myself was produced by no particular *idiosyncrasy*, I will relate a corroborating experiment communicated to me by my friend Mr. Dart.

“ April the 20th, 1799. About 12 o'clock at noon, I applied to the internal parts of my thighs, and also the soles

* Crumpe, on opium, page 24.

† I am credibly informed, that many of the Dutch inhabitants of New-Jersey, apply the leaves of tobacco, steeped in water, to the external part of the stomach, and continue the application until a vomiting is induced. This they frequently practise, in preference to an internal emetic when under the necessity of puking their children.

of my feet, a large quantity of the dried leaves of tobacco, well stewed in about a pint of water, previously washing the part with warm vinegar, so as to open the pores and promote absorption.—In about two hours after the application was made, I felt some degree of lassitude, accompanied with a dizziness and head-ach, which were evidently increased on the third hour ; when it operated as a gentle cathartic.

At 4 o'clock, a nausea at my stomach was very perceptible, so much so, that I removed the application for fear of vomiting,* which generally affects me materially, and, therefore, wished to avoid it. I made several efforts to eject the contents of my stomach, but without effect. In half an hour after, this affection began to subside, and I felt much relieved, but still some degree of head-ach continued, together with a disagreeable languor.”

E X P E R I M E N T 7.

I made a strong decoction of the dried leaves of tobacco, and gave twenty drops of it to a mouse. In the short space of ten minutes it discovered strong marks of an almost insupportable pain, attended with tremor and convulsions, quickly succeeding each other ; at the expiration of thirty minutes, with a few violent efforts, it suddenly expired.

E X P E R I M E N T 8.


I injected by means of an ivory syringe, a small portion of the above mentioned decoction, into the rectum of

* Professor Barton informed me, that he was called to a man, who had taken a large dose of opium ; he gave an emetic, but being desirous of keeping up vomiting, he applied tobacco leaves, steeped in vinegar, to the stomach, which had the desired effect.

another mouse, which evidently exhibited all the symptoms of the former, and equally as vehement in degree, for the little animal fell a victim to this exhibition, in the course of twenty minutes.

E X P E R I M E N T 9.

After perforating the side of a mouse, I injected a small quantity of the strong decoction of tobacco, taking particular care to avoid the introduction of air, by applying the mouth of the syringe instantaneously to the aperture. In ten minutes it discovered symptoms of a violent affection: the respiration became considerably increased, which was quickly succeeded by strong convulsions; in fifteen minutes, a paralytic affection, agitated the whole frame, and in twenty, a violent corrugation of the body, closed the scene.



C H A P T E R III.

Observations on the noxious effect of tobacco on the human species, when used in the form of smoking, snuffing, and chewing.

THE use of tobacco as an *article of luxury*, in all its noxious forms, comes now to be considered; but before entering into the particulars of each, I must beg leave to offer a few preliminary observations. It is generally admitted that “man is an imitative animal;” to adopt, therefore, from the example of others, what is pleasurable to

our feelings, or subordinate to use, should not be deemed strange: but that a *rank and noxious weed*, at first loathsome to the sense of taste, as well as prejudicial to the constitution, should, by habit become desirable, is a circumstance the most extraordinary, affording one striking instance, among many, “of the folly and infatuation of the human mind, and the force, and prevalence of custom opposed to sense and nature.”

Without entering further into an enquiry on this head, I shall at once commence with some few remarks on tobacco, when used in the form of smoking.

Persons who habituate themselves to the immoderate use of this plant, sooner or later, experience its noxious powers, by the many disagreeable emotions excited by its influence over the system.

Smoking in particular, by its stimulating effects on the mucous follicles and salivary glands, abstracts profusely their contents, and excites immoderate expectoration: Hence its influence in inducing *dyspepsia*; for by abstracting that liquid,* so essentially requisite for the purpose of digestion, it seems just to suppose, that here it must inevitably prove the direct instrument of so malicious a disease. It is alledged by Dr. Cullen in his materia medica,† that this plant evidently possesses a *narcotic power*, and through this

* Rush's M. S. Lectures. “That the saliva is requisite for digestion, I infer, from its once being customary in Spain to make use of an aromatic gum to perfume the breath; this had a very pernicious effect, as it diffused dyspepsia throughout that place.”

† Cullen's Materia Medica, p. 189.

means, weakens the tone of the stomach in such a manner as to preclude the performance of its respective functions.

From the preceding experiments, it has been ascertained, that nicotiana possesses strong *stimulant* qualities, and therefore, Dr. Cullen's *narcotic power*, is to be explained by the stimuly being carried too far, and thereby inducing *indirect debility*. To corroborate this position, I will relate the following singular fact, which not long since came under my own inspection.

A young gentleman, after being somewhat intoxicated by drinking of wine; undertook for the first time, the smoking of a segar; after having inhaled it as long as he could with safety to his mouth, he observed that it was customary for gentlemen to fling away the remaining part of the segar; but, for his part, he thought it extremely inconsistent, and highly improper, and, as he expressed himself, to shew his œconomy, would put it to a better use, by chewing, rather than part with *so inestimable a treasure*: but unfortunately for the poor youth, he had not gratified himself long in the enjoyment of his luscious morsel, before he fell prostrate on his back, to the great astonishment of all the surrounding company, until they recognized the cause of so unexpected a transition. He was conveyed to an adjacent room, where he remained apparently lifeless for a considerable space of time, and would probably have fallen a martyr to his folly and imprudence, had not medical aid been near at hand: The attendant physician accurately inspected his case, and very properly abstracted twelve or fourteen ounces of blood from his arm;* when a vomiting en-

* Doctor Allston, of South-Carolina, informed me, that he was called to a lady, who had intentionally taken a dose of laudanum,

fued, attended with a profuse diaphoresis, which happily dissipated every doubt of his recovery, and soon restored the youth to his former state of salubrity.

We may infer from this fact, the infinite power of nicotiana, when used by those who have never been accustomed to its noxious effects.

Smoking has been alledged by some authors to have oftentimes proved advantageous in dispelling contagion of almost every description; but others have opposed this assertion, with such valid arguments, and have produced such substantial facts in support of their opinions, that it is now almost universally believed, that tobacco possesses no such virtue.

I shall now proceed with some few remarks on snuffing, another form in which the deleterious effects of Nicotiana are evidently depicted.

Snuffing, like that of smoking, may, by many repetitions, be rendered perfectly simple and harmless with respect to its nauseating powers at first, so that its peculiarities may at length be totally dissipated: tho' even this does not evade the force of its action over those who practise its use in certain quantities, for we find that those very persons accustomed to the taking of snuff, by exceeding the portion limited, are attacked with every disagreeable symptom,

for the purpose of destroying life. He hastened to her assistance, and immediately administered a vomit, but without producing the desired effect. The dose was repeated and with the same result. He then abstracted a few ounces of blood, and vomiting immediately ensued, which restored the woman to health.

which they so evidently experienced on the first employment of it.

“ On this subject” says Dr. Cullen, “ it is to be remarked that the power of habit is often unequal ; so that persons accustomed to the use of tobacco, a lesser quantity, than what they had been accustomed to, will often have stronger effects than had before commonly appeared. I knew a lady who had been for more than twenty years accustomed to take snuff, and that at every time of day ; but she came at length to observe, that snuffing a good deal before dinner, took away her appetite : and she came at length to find, that a single pinch, taken any time before dinner, took away almost entirely her appetite for that meal. When however, she abstained entirely from snuff before dinner, her appetite continued as usual ; and after dinner, for the rest of the day, she took snuff pretty freely, without any inconvenience*.”

This is further corroborated by an assertion of Doctor Rush’s†. “ I once attended a gentleman,” says the Doctor, “ who had been for some time troubled with pains in his stomach, attended with a diminution of appetite, and some degree of emaciation. I observed that he frequently practised the taking of snuff, to which I attributed his disease, and advised him to suspend the use of it. He accordingly did so, and soon began to mend very fast. I was informed by him, a few weeks after, that he had gained thirty weight in flesh, and was at that period, in the enjoyment of perfect health.”

* Cullen’s *Materia Medica*, page 187.

† Professor Rush’s *M. S. Lectures*.

It greatly injures the organs of smelling, as the infinity of nerves, which are diffused throughout the mucous membrane of the nose, on which depends its sensibility, and the acuteness of our smelling, become considerably impaired by the acrimony of snuff. “The use of this subtile powder, is further rendered odious by discolouring the skin contiguous to the nose, and will taint the sweetest breath with the rank odour of a tobacco-cask. For this reason the ladies of fashion in France, seldom take snuff till they are married; a very high compliment no doubt to their husbands.”

“The only advantage,” says Dr. Leake*, “of taking snuff, is that of sneezing, which, in sluggish, phlegmatic habits, will give universal concussion to the body, and promote a more free circulation of the blood; but of this benefit, snuff-takers are deprived, from being familiar with its use.”

Chewing, the most odious form in which nicotiana can possibly be used, next engages our attention.

The constant chewing of tobacco impairs the appetite, in a similar manner to smoking, from a profuse discharge of saliva by expectoration‡, so necessary for the preservation of the body, particularly in persons of a thin habit.

* Leake on the viscera, page 69.

‡ Dr. Cullen observes that “this practice is also the occasion of the greatest waste of saliva; and the effects of this in weakening digestion, and perhaps from thence especially, its noted effect of producing emaciation may appear. Cullen’s *Materia Medica*, page 190.

The nauseous taste of the plant being more immediately abstracted by this process, than either of the others hitherto mentioned, precludes its being carried so far by those who have recourse to it, without considerable danger attending such a procedure. Persons, therefore, who are desirous of effecting their cuds in this *polite accomplishment*, are compelled to be extremely particular in regard to the quantity, and time of using it, for if continued too long with a *novice in this art*, we find evident marks of its occasioning extreme anxiety, vertigoes, stupors, and disorders of the senses. Notwithstanding the greatest caution of tobacco-chewers, a small portion of the saliva, tinged with this plant, will frequently insinuate itself into the stomach, and thereby impair the functions of that viscus.

As longevity depends on a healthy state of this organ, being one of the most important throughout the animal œconomy, the habits of those who addict themselves to this pernicious custom become vitiated, and consequently, the number of their days are considerably shortened. But, as the use of tobacco in this form, most generally prevails among the vulgar, upon whom friendly admonitions are too frequently thrown away, I shall not dwell long on the subject; well knowing the great difficulty of eradicating prejudice from ignorant minds, though a circumstance much to be regretted.

CHAPTER IV.

Of the prejudicial effects of the use of Tobacco on the moral faculty.

The general demand for tobacco, as an article of luxury, is owing, I am convinced, to a servile attachment for

imitation. Many customs equally odious, have of late become fashionable from the same cause, and it is to be regretted, that men whose exalted situations in life ought to have rendered them superior to such weaknesses, have been the principle propagators of these pernicious practices. The example of such characters is, unfortunately, esteemed by persons in the more subordinate walks of life, as the standard of human perfection; hence when vicious customs are brought into use by men of this description, the impression which is made on illiterate minds is more durable, and the prospect of eradicating them more gloomy.

This plant was first introduced into England by Sir Walter Raleigh, about the year 1585; this nobleman used it in the form of segar, and hence the despicable habit of smoking was speedily contracted by the inhabitants of that kingdom.

I presume, our forefathers, must have borrowed this custom from the aborigines of America, as we are informed, these Savages used it long before it was introduced into the civilized world.

Our ancestors then, have entailed one of the most odious vices on their sons and daughters; for sorry am I to observe, that this plant is used by females, as well as males.

Their delicate habits, it was to have been hoped, would have prevented them from the luxurious use of such a nauseous weed, but fatal experience has taught us, that our expectations were merely the results of benevolence; with exalted notions of female delicacy, blended with a natural affection for the sex, we fondly anticipated, that they would

preserve themselves aloof from such a detestable custom, and therefore expected that a seegar would never find admittance within their ruby lips.

How far these expectations have been realised, experience will declare.

The use of this plant is not solely confined to those ladies, who have passed the meridian of life, for in such a case the evil would not be so great, but the young and the blooming also delight in inhaling the fumes of tobacco; from this source we may expect much mischief, for as habit will render this weed as essential to their happiness, as their daily food; so also we will naturally see the rising generation, fondly allured to a similar attachment.

It is granted that smoking, or chewing, universally produce thirst, therefore a desire for strong drink is excited; and as these, when taken between meals, are generally the forerunners of intemperance and drunkenness, so also is vice universally the consequence. This is proved beyond the possibility of doubt, by Dr. Rush* in his observations on the use of tobacco; he observes its influence in promoting intemperance, in the following words—"One of the greatest sots," says the Doctor, "I ever knew, acquired a love for ardent spirits, by swallowing cuds of tobacco, which he did, to escape detection in the use of it, for he had contracted the habit of chewing, contrary to the advice and commands of his father. He died of a dropsy under my care in the year 1780."

* Rush's Essays, page 270.

From this fact we see, in the most undisguised manner, the pernicious effects of this weed, not only on the morals, but on the health, and ought we not then to endeavour to wean ourselves from the use of a plant, which evidently impairs our ability for living as rational beings, and insures for us an early grave ?

We daily witness the horrid effects of inebriety, in our intercourse with the world ; a train of evils are produced, which totally disqualify the slaves of it from living in the polished walks of society ; they become objects of pity, and contempt, by men of genius and worth, and being excluded from the society of such, they fly to the haunts of vice, and frequently end their days, in a tavern or a brothel.

Idleness is also generated by the use of tobacco, and though it cannot be considered so immediately destructive to health and moral rectitude, as the habit of drunkenness, yet the effects are equally extensive, though slower in their operation. The social duties of life are neglected, and every thing valuable and interesting is totally disregarded. Our country, our connections, and our friends become objects of but little regard, and finally we attain to such perfection in indolence, that even the necessary duties of life, which only extend to ourselves, are considered as burthensome, and at last totally neglected.

These are generally the effects of a servile fondness for tobacco ; and I could enumerate many more, if my time would admit, which are equally disgusting in their nature ; however, as custom has rendered this plant so essen-

tial to the happiness of many of our fellow citizens, it cannot be expected that these, or any other remarks, would have a tendency to discourage the use.

CHAPTER V.

Of the analysis of tobacco, and the operation of its constituent parts on living systems.

EXPERIMENT IO.

I boiled two pounds of the dried leaves, in six quarts of water, down to four; the liquor was then strained, and carefully evaporated, over a gentle fire, to the consistence of an extract, which weighed four ounces.

EXPERIMENT II.

To two ounces of the above extract, I added four ounces of pure alcohol*, and triturated them together, for sometime in a mortar; after which I poured off the menstruum, and by the affusion of distilled water, precipitated the resin, from the alcohol; this I evaporated with a gentle heat, and then weighed the residuum, which proved to be three drachms of pure resin.

EXPERIMENT I2.

Half a pound of the dried leaves of tobacco, put into a crucible, heated red hot, and calcined in the open air

* As the spirits of wine is frequently adulterated by the apothecaries, I was at the trouble of distilling it myself, so as to procure it as concentrated as possible.

yielded an ounce and an half of white ashes; to this I added boiling water several times, and filtered the whole. The residuum, when dried, weighed one ounce; so that the water took up half an ounce of the vegetable alkali, as is sufficiently exemplified in the following experiments.

E X P E R I M E N T 13.

In order to ascertain whether the substance taken up by the water, in the preceding experiment, was of the nature of a vegetable alkali, I submitted it to the following tests.

1st. To a small portion of this mixture, I added an aqueous solution of *Corrosive sublimate*, which was instantly precipitated of a brick-dust colour.

2d. I added a few drachms of this filtered mixture, to a solution of the *sulphate of iron**, which instantly rendered it of a black turbid colour, somewhat tinged with a darkish green.

4th. It precipitated the *sulphate of copper*† of a greenish hue.

5th. A piece of paper, stained yellow with *turmeric*, was stained of a brownish hue.

6. Litmus paper was changed, to its pristine blue colour, after being turned red by the *nitric acid*.

7. A piece of paper, stained red by the brasil wood was changed from its original colour, to a beautiful purple.

* Green Vitriol, or Copperas.

† Roman, or Blue Vitriol.

All the above tests, were made individually with an aqueous solution of pot-ash, and precisely with the same result, which incontestably confirms the analogy of the two.]

E X P E R I M E N T 14.

The water which was poured on the ashes of the tobacco, was laid aside to evaporate spontaneously, when it yielded crystals of the carbonate of pot-ash, and common salt.

E X P E R I M E N T 15.

To the substance which remained after the affusion of hot water, weighing one ounce, I added half an ounce of sulphuric acid, diluted with water, and suffered the mixture to boil for a few minutes, over a gentle fire; I then poured it off, and when filtered very clear, it was placed in a shallow vessel, to evaporate; in a few days, crystals of the sulphate of alumine, were obtained. The residuum consisted of silicious earth, and weighed six drachms.

E X P E R I M E N T 16.

To half an ounce of the extract, I added four ounces of concentrated nitric acid, which were boiled together over a gentle fire. A large quantity of nitrous gas escaped, but as soon as the whole was evolved, the mixture was taken off, and it yielded crystals of the oxalic acid.

E X P E R I M E N T 17.

Half a pound of the dried leaves were calcined in a red

hot crucible, which emitted a considerable vapor. I covered the vessel close, and suffered the smoke to pass through a tube, which was condensed in a receiver: by this process, I procured several ounces of the distilled water, and near half an ounce of an empyreumatic oil, which trickled down the sides of the vessel, and floated on the surface of the water.

In order to ascertain the difference in strength between the resin and the gum, I made the following experiments.

E X P E R I M E N T 18.

To Thomas Howel, aged fifty, whose pulse beat 66 strokes in a minute, I administered two grains of the resin, obtained by the means particularized in experiment eleventh, suspended in a little water, about two hours after he had breakfasted on bread and chocolate. The result of this experiment was as follows.

In	5	10	15	20	25	30	35	40	45	50	55	60	Min.
P. beat	66	66	69	69	70	71	75	72	71	70	66	66	

He complained of considerable nausea at his stomach, but no vomiting. He shortly after had a passage, and voided a copious flow of urine.

E X P E R I M E N T 19.

To John Wheelder, a man of the same temperament, I gave four grains of the extract, deprived of its resin. His pulse beat 68 strokes in a minute, and the following was the result.

In	5	10	15	20	25	30	35	40	45	50	55	60	Min.
P. beat	70	73	74	75	77	78	78	76	73	70	70	68	

In fifteen minutes, he complained of a nausea; in 25, the nausea increased, attended with a little head-ach. In 30 minutes he perspired, and felt somewhat giddy. About the fortieth minute, he had a copious evacuation downwards, which relieved him considerably. At the end of the hour, he felt much better, though still some nausea at his stomach, which wore off in the course of two or three hours.

I was favoured with the following interesting experiment, by my ingenious friend Mr. Lee, aged about twenty, an apothecary to the Philadelphia Hospital.

E X P E R I M E N T 20.

At 9 o'clock, P. M. three hours after drinking some tea, and eating bread, I took two grains of the resin, that you gave me, made up into a soft pill, with a small portion of flour, and drank water after it, so that there was no taste perceived. From several previous examinations, my pulse beat sixty-eight strokes in a minute, and the alterations produced in it, are marked, in the following table, viz.

In	5	10	15	30	40	45	55	60	65	70	75	Min.
P. beat	73	78	90	94	90	87	90	89	85	80	78	

In	80	85	90	100	105	110	115	120	125	130	135	min.
P.B.	76	74	77	77	77	75	74	74	73	67	66	

“ In five minutes I felt a good deal of pain at my sto-

mach, which continued constant for two hours. This continuation of the pain, induced me to carry on the experiment, as far as I did, to see more particularly the result of its operation. In eight minutes, I began to perspire, and in fifteen and eighteen minutes, the perspiration increased most profusely, particularly on my upper extremities, and forehead. At ten minutes, I felt giddy, and soon became vertiginous, with an evident tremor throughout my frame. These effects went off at thirty five minutes. I vomited four times, viz. at the 20th, 35th, 50th and 90th minutes. This vomiting was as violent, as I have ever experienced from tartar emetic. During the whole time I belched a great deal. After these affections subsided, I voided urine, and felt disposed for a passage downwards, but being late at night, I did not indulge myself.

“ This last affection I attributed solely to the purgative quality of the medicine, as I had a passage this forenoon, which generally attends me in the four and twenty hours, when in a healthy state; but seldom more, and sometimes, I pass the whole day without such an evacuation.

“ N. B. I took particular care not to examine my pulse after vomiting, until the expiration of five minutes; and always before noting it, I remained still in one posture, at least two minutes, in order that it might not be increased by exertions of any kind.”

Mr. Lee informed me, that he does not use tobacco in any form whatever, to which may be attributed, the violence of the symptoms, as well as great increase of pulse, for we find the same quantity did not produce such violent affections in Thomas Howel, who occasionally indulged himself in the taking of a little.

E X P E R I M E N T 21.

I gave three drops of the distilled water,* as procured in the 17th experiment, to Thomas Howel, on whom the 18th experiment was made. His pulse beat 68 strokes in a minute, and it affected him in the following manner.

In	5	10	15	20	25	30	35	40	45	50	55	60	min.
P. beat	69	71	71	73	75	78	76	76	74	71	70	67	

In fifteen minutes, he said that his stomach felt a little warm, as if he had drank brandy and water. At the 25th minute a nausea occurred. In thirty-five minutes, still some sickness at his stomach, but not so perceptible as before. In 55 and 60 minutes, he experienced no further inconvenience from the dose.

E X P E R I M E N T 22

To ascertain more particularly the operation of the distilled water, I took three drops in a little cold tea, on an empty stomach, my pulse beating 68 strokes in a minute, and the following was the effect.

In	5	10	15	20	25	30	35	Min.
P. beat	70	70	72	73	77	80	80	

In	40	45	50	55	60	65	70	75	Min.
P. beat	80	80	76	72	66	66	68	68	

* This water was extremely acrid, and somewhat impregnated with the oil.

In ten minutes, I felt a warmth throughout my throat and stomach; in twenty minutes my head became a little confused, and the nausea increased. At the thirtieth, I made several efforts to eject the contents of my stomach, but without effect, and in forty minutes this disposition for vomiting subsided. There was a considerable moisture on my forehead, until the forty-fifth minute, but disappeared on the sixtieth. In an hour and fifteen minutes, every symptom totally vanished, and I remained perfectly composed for the remainder of the evening.

E X P E R I M E N T 23.

Five grains of the extract were dissolved in water, and given to a cat, which induced vomiting in the course of five minutes; this continued for near half an hour, with intervals of six or eight minutes. After this time the vomiting subsided, and the animal perfectly recovered.

E X P E R I M E N T 24.

Five grains of the extract were dissolved in one ounce of water, and injected into the rectum of a small dog: in three minutes it began to be extremely restless; in five it ran about the room, and apparently in great distress; it continued thus for seven or eight minutes, when a copious evacuation took place, which relieved it considerably; the animal was divested of every indication of pain in the space of thirty minutes.

E X P E R I M E N T 25.

I injected ten grains of the extract dissolved in half an ounce of water, into the rectum of a full grown cat, which

produced slight convulsions in the abdominal muscles, and a great degree of inquietude for the space of thirty minutes; a copious evacuation succeeded these symptoms, which lessened them considerably; at the expiration of an hour, they were evidently diminished, and, to every appearance, totally subsided in the course of two hours and a half.

E X P E R I M E N T 26.

Three hours after performing the above experiment, I administered to the same cat, ten grains of the resin suspended in water, which produced violent contortions of the abdomen, in the short space of ten minutes: free and repeated discharges were the result of this exhibition; and the poor animal discovered by its mewing, and grimaces, such exquisite torture, that at the 20th minute, I injected the like quantity into its mouth, in order to put an end to its existence. In less than thirty minutes, these affections were greatly increased, and a violent vomiting ensued, attended with great commotions of the stomach, and repeated discharges of its contents. In forty minutes the convulsions of the abdominal muscles, were considerably augmented, and an incessant tremor pervaded the whole frame. In this deplorable situation it continued for some time, when it sprung up, and hobbled across the room. In an hour and ten minutes, it foamed considerably at the mouth; the respiration became quick and extremely laborious, and it assumed, in every respect, the appearance of a rabid animal; the spasmodic contractions of the stomach and abdomen were greatly promoted, and the poor animal appeared for a time, as if it would eject the very stomach itself.* In this dreadful state it remained until near the 2d hour, when death as a benign attendant closed the lamentable scene.

* Similar symptoms took place from the exhibition of two drachms

E X P E R I M E N T 27.

I gave to a large dog, thirty grains of the extract, consisting of the gum and resin, which produced no sensible effects for the first hour; in an hour and fifteen minutes, he discovered some commotion in the stomach, by the saliva which run from the mouth, and also by several convulsions of the body, as if inclined for vomiting. Nothing was ejected from the stomach, but the dog had copious and repeated discharges through the medium of the rectum, for several hours after. The ensuing day he had perfectly recovered, and sustained no apparent inconvenience from his bolus.

E X P E R I M E N T 28.

Fifteen grains of the resin were given to a dog of the same strength, which caused an inclination to vomit in the

of camphor, and as the analogy is so great, I will give the extract from the London medical observations, as related by Mr. Hoffman. "I gave," says Mr. Hoffman, "to a large grey hound, two drachms of camphor, in a ball of hogs lard. Three quarters of an hour after, the dog began to look wild and furious, lolled out his tongue, worked in his flanks, as if excessively fatigued. I found the nervous parts so violently contracted, their rigidity so great, and the dog when attempting to walk, instead of advancing, recoiled backwards, dragging his forelegs after him, as if he dreaded by going forwards, to fall down a precipice. He then fell into convulsions. After a little time he got up, began to walk, striking his head against any thing, that happened in his way; tumbling and tottering as if intoxicated. When I offered him some water to drink, notwithstanding he appeared very thirsty, he refused it. The symptoms resembled the *hydrophobia*. In about twenty-four hours every appearance of madness, gradually subsided, and left the dog in a quite weak and feeble condition; but afterwards he recovered gradually.

space of half an hour. In three quarters, he threw up the contents of his stomach, and appeared for some time in great anxiety. In an hour, he had a large evacuation from his bowels; and the medicine operated various times, both as an emetic and cathartic.

For the succeeding part of the day, he appeared as usual, and no further inconvenience attended this exhibition.

E X P E R I M E N T 29.

Thirty drops of the distilled water, as procured in experiment 17th, was given to a cat, which occasioned convulsions in five minutes. In ten it sprung about, and contorted its body in a variety of forms; the convulsions, in twelve minutes were so much augmented, that it was affecting to behold the torture of the animal, and in this exquisite pain it suddenly expired.

E X P E R I M E N T 30.

I applied three drops of the oil of tobacco to the tongue of a cat, which almost instantaneously produced convulsions, and in six or eight minutes, its breathing was stertorous, accompanied with tremors, and considerable pain.* It recovered considerably in the course of an hour, and in about an hour and an half, seemed to enjoy its pristine composure.

E X P E R I M E N T 31.

After laying bare several muscles of the leg of a pige-

* This is taken notice of in the new Royal Encyclopedia, under the head of *Nicotiana*.

on,* I applied two drops of the oil of tobacco, which almost instantaneously occasioned a spasmodic affection, and such a degree of rigidity in the whole of the extremity, as to induce an inability for motion; a quick respiration accompanied the whole, attended with a violent palpitation of the heart, and a considerable tremor, throughout the extremity.

These symptoms continued for twenty minutes, but after the expiration of half an hour, gradually diminished and totally subsided in the course of an hour. In attempting to catch it, it walked across the room, but with some difficulty. In an hour and fifteen minutes, it ejected† the contents of its stomach, which relieved it considerably, and occasioned its assuming a more lively aspect.

No disagreeable consequences ensued, and it perfectly recovered these affections.

E X P E R I M E N T 32.

The muscles of the lower extremity of a frog, were laid bare, and four drops of the oil of tobacco applied to them, which occasioned, in five minutes a paralysis of the limb,

* I am conscious of the apparent inhumanity of many of the experiments here inserted; but when we reflect on the necessity which frequently occurs of our resorting to them in particular enquiries, relative to the various operations of medicines, I flatter myself that I shall be deemed sufficiently excusable for practising them as often as I have done.

† The Indians poison their arrows, with *the oil of tobacco*, which, infused into a fresh wound, occasions sickness, and vomiting, or convulsions and death.

and small tremulous motions throughout the whole body: the limb remained perfectly inactive; the ischiatic nerve was then pricked, in order to ascertain, whether the part was deprived of its contractile power, but no visible effect was produced: upon touching the ischiatic nerve of the other extremity, a violent contraction of the leg instantaneously took place.

This experiment was repeated divers times, and with the same results.

E X P E R I M E N T 33.

An opening was made in the teguments on the back part of the neck of a pigeon, and raised without injuring the fleshy part of it. Four drops of the oil of tobacco were then introduced. In five minutes, it indicated some degree of pain, by a flapping of its wings, and on the seventh minute, it was attacked with a tremor, when its feet became rigidly extended, and on the tenth, it instantly expired.

E X P E R I M E N T 34.

The breast of a pigeon was punctured, and the orifice filled up with several drops of the oil of tobacco. In five minutes the legs were seized with an inability for motion. The breast was now its only support, and it continued in this situation, for forty minutes. It indicated great pain the whole of this time, and was surprisngly convulsed. It made several efforts to vomit, but its stomach being empty from a long confinement, nothing was ejected. At the expiration of an hour, it arose, and walked across the room.

The pigeon sustained no further injury, and was perfectly lively, two days after.

Observations on the Experiments.

AS I have already taken notice of the particular operation of tobacco, on the human system, in a preceding part of this work, I shall avoid prolixity by referring to those pages,* where an accurate definition has already been offered; the inferences of which are drawn from several of the preceding experiments. I shall, therefore, without further comment pass them over, and proceed to an examination of the fifth experiment, where we have an opportunity of observing the stimulating effects of tobacco, when applied externally to an irritable surface.

In reviewing the sixth experiment, we find that Nicotiana proves a gentle emetic, when externally applied to the body, which fact is also corroborated, by an experiment of my friend Mr. Dart's, already taken notice of. In cases where internal emetics may be objected to, this application may be adopted with little or no inconvenience, particularly as its operation is of a very lenient nature.

In regard to the experiments made on the mice, it is to be observed, that death was almost an immediate attendant on each. I dissected several of these animals after the extinction of life, in order to see if I could trace any marks

* Pages 32 and 33.

of inflammation. In two or three that I opened, no visible effects were produced; in others, the minute blood vessels throughout the intestines, were somewhat florid, but perhaps this might have proceeded from some other cause. Here it may be presumed, that the *excessive stimulating quality* of this plant, was disproportioned to the *excitability* of their systems, and consequently death was induced, before any *inflammatory type* could possibly have taken place.*

With respect to the constituent parts of tobacco, we find, agreeable to the eleventh experiment, that it possesses an extract consisting of a gum and resin, two ounces of which afforded three drachms of pure resin. From the several experiments that I have made, the most active property of this plant consists in the resinous portion.

The ashes obtained from the twelfth experiment, yielded a large portion of vegetable alkali, as is sufficiently confirmed from the tests enumerated. The fourteenth experiment afforded crystals of the carbonate of pot-ash and common salt; from the fifteenth was obtained the sulphate of alumine.

Crystals of the oxalic acid, were procured from the sixteenth experiment. The seventeenth afforded a water extremely pungent when applied to the tongue, and the oil which floated on its surface was very acrid, when in contact with a denuded surface of the body. We may perceive from

* Dr. Rush remarks that the same frequently occurred, with persons who died suddenly of the yellow fever. "It is owing," says this acute physiologist, "to a *sudden prostration* of the system, before the *existence of morbid action*, without which no inflammation can take place."

the results of the 18th and 19th experiments, the difference existing between the gum and resin, for both of the men on whom these experiments were performed, were of the same temperament, and occasionally practised the chewing of tobacco. From the twentieth experiment, which was performed by Mr. Lee, we see clearly manifested the immense power of the resinous portion of the extract, and its virtue as a medicine, occasioning nausea, a profuse perspiration, and at length vomiting.

Tobacco appears to be unequivocally a powerful diaphoretic, and as such it has proved efficacious in a variety of diseases. It is to be regretted that its exhibition is not oftener repeated; for there are testimonies of its salutary influence in many obstinate fevers, which predominated over the most powerful remedies which are esteemed valuable for exciting a speedy and profuse perspiration.

The twenty-first and twenty second experiments, evince the immense power which the distilled water possesses: physicians formerly made use of it with advantage, and I entertain not the smallest doubt, but that, with a proper dilution, it may now be administered with much efficacy.

The twenty-third, twenty-fourth, and twenty-fifth experiments, clearly demonstrate the emetic and purgative qualities of this plant; and the twenty-sixth, twenty-seventh, and twenty-eighth, again elucidate the difference existing between the gum and resin; for, agreeable to these experiments, we find that one half of the latter, operated more powerfully than twice the quantity of the former.

The immense acrimony of the distilled water, is evi-

dently depicted in the twenty-ninth experiment, for the small quantity of thirty drops produced convulsions and death in a cat, in the short space of twelve minutes. The thirtieth, and the succeeding experiments sufficiently evince the power with which the oil of tobacco is endued, occasioning a universal tremor throughout the whole frame, and a paralysis of the parts to which it was applied.

An account of its medical virtues, in eradicating certain diseases.

THE medical powers of tobacco were generally known among physicians, at an early period, who ascribed many virtues to it in certain obstinate diseases. With respect to its operation as a general evacuant, I may, from my experiments, and the corroborating assertions of various authors, pronounce this medicine a valuable acquisition to the materia medica; and that its evident operation on the system, is that of a *sudorific*, an *emetic*, a *cathartic*, and a *diuretic*. Hence the propriety of its use, in a variety of diseases.

In cases of ascites and other dropical affections, it appears to be an invaluable remedy.

As a diuretic, I would venture to assert, that it is excelled by few, if any of our indigenous plants. The *digitalis purpurea*,* which grows luxuriantly in South-Caroli-

* Purple Fox-glove.

na, has been much celebrated for its diuretic quality, by medical characters ; but I have seen instances where the tobacco has eradicated several violent cases of *ascites*, where this had proved but of little effect. “ Diuretics,” says a much celebrated character,† “ have so long been employed with benefit in the treatment of dropsies, that it becomes a matter of consequence, to increase the number of the medicines of this class, and to learn how to exhibit, with more advantage, those which are already known.” In how great estimation then should we hold that plant, which is evidently endowed with a power of evacuating the accumulated water by a natural discharge, for the relief of *ascites* and other dropical affections, in lieu of resorting to a surgical operation, which is painful and disagreeable to the afflicted patient ; that *nicotiana* possesses this quality, no one will pretend to deny.

Every practitioner of medicine, who has attentively perused the publication of the ingenious Doctor Fowler, on the effects of Tobacco, with respect to its diuretic quality, must candidly acknowledge its salutary effects, in cases of dropsy and dysury. The uniform result attendant on his experiments, together with the many proofs of its virtues which have come under my cognizance, clearly evince the indefinite worth of this plant, and the necessity of administering it in those cases of dropsy, which seem to triumph over medicines of less efficacy, although held in the greatest repute.

To illustrate this still further, I have been informed by several persons of unquestionable veracity, that a variety

† See professor Barton’s essay towards a *materia medica* of the United States. page 34.

of the most violent cases of dropsy, many of which had baffled the skill of the most eminent physicians, were perfectly eradicated by an old negro fellow. His remedy was, for a time, unknown to any but himself, until, by some accidental occurrence, it was discovered to be a simple decoction of tobacco, disguised with some odoriferous herb. As an additional proof of the efficacy of this plant in the various species of dropsy, I shall take the liberty of introducing the opinion of Dr. Cullen, when considering the effects of vomiting, in promoting absorption, and thereby relieving patients affected with dropsy. "Spontaneous vomiting," says the Dr. has sometimes excited an absorption in hydropic parts, and thereby drawn off the waters lodged in them, it is reasonable to suppose, that vomiting excited by art, may have the same effect; and accordingly it has been often practised with advantage*." The doctor then proceeds with observing, "that there are no means we can employ to procure a copious evacuation of serous fluids, with greater certainty than the operation of purgatives, and it is upon these accounts, that purging is the evacuation which has been most frequently, and perhaps with most success, employed in dropsy†." He further remarks "that the kidneys afford a natural outlet for a great part of the watry fluids, contained in the blood vessels; and the increasing and excretions by the kidneys‡ to a considerable degree, is a means, as likely, as any other of exciting an absorption in dropical parts. It is upon this account that

* Cullen's First lines Vol. II. page 407.

† Cullen's Practice of Physic. Vol. II. page 408.

‡ It is recommended by Dr. Sydenham, when treating of diuretics in dropical cases, "that where the waters are not to be discharged by vo-

diuretic medicines have been always properly employed in the cure of dropsy. It happens however, unluckily, that none of *them* are of a *very certain operation*". He then proceeds by announcing the utility of sudorifics, in many cases of dropical affections, and affirms, that they have proved salutary in many instances.

As I have had some opportunities of witnessing the happy effects of tobacco, and its various operations on the system, I would beg leave to observe that all these virtues hitherto enumerated by Doctor Cullen, appear to be, under certain circumstances, concentrated in this plant; from my experience, I may venture to assert, with some degree of confidence, that it has proved of ineffimable worth for the relief of patients afflicted with dropsy.

In reviewing what I have written on the medical properties of this plant, I perceive that my limited information has prevented me from doing ample justice to the subject: in order, therefore, to extenuate my deficiencies, I shall

miting or purging; for instance in weak constitutions, and hysteric subjects, they cannot be evacuated by *purgatives*, and much less by *vomitives*, but are to be carried off by *diuretics*. Several of this kind are extolled in the writings of physicians, but the most, if not the only efficacious ones, in my opinion, are those prepared from *lixivial salts*, from whatever plant the ashes be obtained". Doctor Wallis observes that the ashes of tobacco, has oftentimes proved efficacious in the relief of dropsy. Wallis's Sydenham. Vol. II. page 289.

* Doctor Fowler observes on this head, that such considerations first induced him to make trial of a greater variety of diuretic medicines in dropical cases, than have generally been used; in hopes of finding some one, more efficacious than the rest: and he flatters himself, he may recommend, as such, the celebrated Indian plant commonly called Tobacco.

apply to the learned pages of Doctor Fowler* for aid, in accomplishing the design of this undertaking.

In this work so replete with medical information, many interesting facts may be collected; and I trust that it will be found on an impassioned examination of our experiments, that I have not departed from truth, nor built my opinions on conjecture.

Doctor Fowler observes that a paragraph, in the third volume of Dr. Duncan's very valuable medical commentaries, first induced him to administer tobacco. It was part of a letter, from Dr. Garden of Charleston South-Carolina, to Dr. Hope of Edinburgh; wherein he says—"Here we use with surprizingly great efficacy, in dropical cases, the alkaline fixed salt of tobacco, &c.

Doctor Fowler remarks that a variety of operations, in different authors, have been ascribed to this plant, and that he was led from this circumstance to ascertain more particularly its virtues; being solicitous of establishing his opinions on a more substantial basis than the assertions of others, he resolved on entering into a minute investigation of the subject, and consequently founded the positions there stated, on his own experience and observation.

The result of this enquiry, has afforded him very favourable ideas upon the subject, and from the number of facts enumerated by him, we may infer, that tobacco, under proper regulations, may be administered internally, not only as a safe, but as an efficacious, and valuable remedy; especi-

* See Doctor Thomas Fowler's Medical reports of the Effects of Tobacco.

ally as a *powerful diuretic* in cases of dropfies and dysurics*.

* To illustrate the manner of its exhibition, and also its salutary effects in many cases, I will take the liberty of inserting a few extracts from Dr. Fowler, as related by him, and which were the results of his own observations.

It appears from many experiments, says the Doctor, that the average dose for an adult, sufficient to produce the desired effect, will be about eighty drops of the infusion; or to speak with some latitude, from sixty drops to one hundred, and to be repeated twice a day.

The properest times for administering the medicine, are two hours before dinner, and at bed-time; it being observed to disagree the most with the stomach, in a morning fasting. And such is the difference between morning and night, that almost every patient will require to take one fourth, and some even one third less, in the forenoon, than in the evening; in order to enable them to bear the doses, with equal convenience. The infusion should always be administered in some vehicle; which may either be water, or any other simple drink.

The common dose just mentioned, relate only to adults of an ordinary constitution; for it deserves particular notice, that between constitutions, which are very nervous and irritable, and those which are very robust, or torpid, or long accustomed to the use of tobacco, the doses will admit of very great, and surprising variations.

As an illustration of this point, I shall here annex a comparative view of the doses of the infusion, administered in ninety four cases of adults; taking the medium-dose of each case, and reducing the whole into four classes, according to the number of drops.

First Class. Medium doses.

21 Cases (3 men, and 18 women), from 35 to 60 drops.

Second Class,

57 Cases, (29 men, and 28 women), from 60 to 100 drops.

A medicine possessing this quality in an eminent degree, has long been acknowledged to be a desideratum in physic; and let it be considered as a further recommendation, that it is found in a vegetable. Because the productions of nature are generally constant and uniform; while those of art, are too often variable and uncertain; which is the case in some of our most powerful chemical remedies.

In Fever.

AS it is not my intention to enter into a particular disquisition relative to the nature of fever, I shall only observe that such medicines as promote a profuse diaphoresis are frequently resorted to by physicians, and I have no doubt but that the infusion of tobacco, in nauseating doses, so as to induce copious sweating, would be attended with very salutary effects.

Third Class.

13 Cases, (9 men, and 4 women), from 100 to 150.

Fourth Class.

3 Cases, (3 men), from 150 to 300.

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Seeing the diversity of doses is so great, I would lay it down as a rule, by way of caution, to begin with sixty drops, or three fourths of the medium-dose, in a case of a delicate constitution; and to increase the number of drops, by five, eight or ten at a time, till by their obvious effects on the system, the proper dose shall be ascertained.

But if the patient should be a male, and the constitution robust, torpid, or accustomed to the use of tobacco, we may safely venture to begin with eighty, ninety, or one hundred drops; and thus, with more expedition, regulate the future doses according to the effects.

In the cure of fever, various means are resorted to by medical characters; some appear to be more particularly attached to the use of the lancet, others to vomiting, some to sweating, and many prefer the use of purgatives, but their objects, it may be presumed, are ultimately the same, viz. *depletion*. Is it not probable then that the complicated operation of tobacco would render its exhibition beneficial in many cases of fever? And would it not, on this consideration, be expedient for physicians to practise the use of it more often than they do?

In testimony of its efficacy, I have a well authenticated fact, where the external application of the leaves to the wrists of a child, produced considerable nausea, a profuse diaphoresis, and at length vomiting, with repeated evacuations downwards. This child had been for some time afflicted with an obstinate fever, and the usual remedies were made use of without any benefit attending them; but by the virtues of tobacco, in the manner above specified, the disease was totally subdued, and the child was happily rescued from impending death.

Doctor Shannon remarks, "that the Africans make use of a sort of poultice of wild tobacco chopped up green, with green *capsicum**, applied to the wrists for the cure of fever, with a decoction of herbs that promote a copious sweat†."

* A species of Pepper.

† R. Shannon, M. D. on Medicine, page 380.

In Nephritis.

IN cases of nephritis calculosa, or gravel, the infusion of tobacco has been given with very good effect; and Dr. Fowler affirms, that he has seen many cases where it proved of infinite utility, and in some instances perfected radical cures. Physicians many years back, were not ignorant of its virtues in such affections, for they have asserted that it has proved “profitable for those who are troubled with a stone in the kidney, both to ease pain, and by provoking urine to expel gravel and the stone engendered therein.†”

Ascarides.

A SPECIES of worms, thus termed from their incessant troublesome motion, which excites an itching. They are small and white, with sharp pointed heads, and generally exist in the rectum.

They oftentimes occasion such uneasiness in some people as to induce fainting, and frequently prove so troublesome throughout the night, as to deprive them of sleep. They are so completely enveloped in mucus, that it is with difficulty they can be eradicated, and frequently they resist the most powerful anthelmintics; but practical authors observe, “that the fumes of burning tobacco injected clysterwise into the rectum, is of singular efficacy.”

Farriers are aware of its immense virtues in such affections, for they generally pronounce it to be infallible in expelling those small worms, commonly called *bots*, which so frequently prove mortal to many horses.

† *Theatrum Botanicum*, p. 711.

In Asthma.

IN asthmatic cases, this medicine has frequently afforded relief, by its expectorant quality;* for agreeable to the discharge of mucous, we find the remission of coughing more or less considerable: but should an inflammatory type prevail, which generally occurs in the recent stage of this disease, its use should be protracted, until proper depletive remedies have had the effect of reducing the system to that state, which would render its exhibition the more efficacious.

In Odontalgia or Tooth-ach.

IN such affections, the smoking of a segar, has imparted considerable relief. A piece of lint, impregnated with the expressed juice of tobacco, has often, in some instances, acted as a charm, in mitigating the violence of the tooth-ach. The oil of tobacco,† dropped on a piece of cotton, of sufficient magnitude to occupy the concavity of the affected tooth, has proved almost instantaneous in its relief. In these various forms, tobacco acts by its stimulating quality, destroying the sensibility of the nerve, and thereby encountering pain. Opium oftentimes acts in like manner, but neither perfect permanent cures; for the pains frequently recur, and the only radical remedy to which we must ultimately resort, is the extraction of the affected tooth.

* Dr. Fowler observes, that he has tried the infusion in many cases of asthma, where it proved expectorant, and procured relief.

† It must here be remarked that this remedy should not be

In Colic.

THE decoction of tobacco, exhibited in the form of an injection, has afforded almost instantaneous relief, after other medicines had proved ineffectual. Particularly as Dr. Sydenham observes, “when the violence of the vomiting do not yield to mild purgatives; for it avails not to exhibit a gentle cathartic, unless perhaps, the patient be easy to work upon, which should be carefully inquired into, because such a medicine, being too weak to make its way through the intestinal tube, does more mischief: the vomiting and pain being increased by its languid and ineffectual motion.*” There was a violent case of this disease, which came under the immediate inspection of Dr. Deas, in South-Carolina; where the beneficial influence of tobacco was very demonstrative. Several powerful cathartics were administered without the smallest effect; and the disorder was degenerating fast into an iliac passion. Recourse was then had, as the last resource, to a strong decoction of the dried leaves of tobacco; immediately after the exhibition of it, through the medium of the rectum, a violent commotion pervaded the whole abdominal viscera; the patient became extremely restless†, and it was with

adopted by persons unaccustomed to the use of tobacco, as the oil is extremely nauseous, and will oftentimes induce vomiting.

* Wallis's Sydenham, p. 277.

† Dr. Fowler remarks, that by a proper administration, these violent effects may be avoided. An ounce of the infusion he observes, will be found a medium dose, in the form of an injection, for an adult of an ordinary constitution; and the general rule by which he was guided, is as follows: Supposing a common injection to have been administered without effect, I would order one of an

the greatest difficulty that two persons could keep him in his bed. At length a profuse discharge ensued, and relief was afforded in a very short time.

In the Iliac Passion.

“IT is highly proper,” says Dr. Sydenham, “to give a strong purging glyster, an hour or two after bleeding*.” In such cases, I have seen the tobacco infusion made use of with considerable advantage. The Doctor himself remarks the salutary effects of tobacco in this disease. “The smoke of tobacco,” he observes, “forced up thro’ a bladder into the bowels by an inverted pipe, has been attended with very beneficial consequences.”

It is asserted in the Royal Encyclopædia, that a strong decoction of tobacco thrown up the rectum, has proved of good effect in what is usually called the *stone-colic*, and also in the iliac passion.

ounce of the infusion, agreeable to the preceding observation, in half a pint of milk, or common gruel, to be immediately injected. If this procured no relief, or excited no giddiness, or nausea, continuing for the space of thirty, forty, or sixty minutes; these last effects in obstinate constipations, most frequently preceding its laxative operation, then I would gradually increase the strength of the future injections, till one or other of these effects should take place.

By this mode of proceeding, the powers of the medicines, whether successful or not, will be fully tried in the space of a few hours; a matter of serious consequence, where suspense is distressing, and delay dangerous.

* Wallis's Sydenham, p. 443.

In Hernia.

IT generally occurs that costiveness is one of the most alarming symptoms attendant on this disease, for the relief of which, stimulating purgatives are generally administered; but it not unfrequently happens that they do much injury, for when they have not the desired effect, they produce a considerable nausea at the stomach, and sometimes vomiting, which promotes the pain and tension of the tumour.

“ In such affections,” says Mr. Bell, “ I would recommend tobacco smoke thrown up in the form of injections, as preferable to every other remedy.*”

In Tympanites Intestinalis.

This is termed a flatulent dropsy, the abdomen frequently becomes considerably distended, and in such cases the chief intention is to discharge the flatulencies: various remedies have been indicated for this purpose, and there have been instances where the infusion of tobacco has proved efficacious after the failure of many of them.

“ A case of two years continuance,” says Doctor Fowler, “ after the trial of various remedies, has been surprisingly relieved by glysters of tobacco prepared in a very strong manner. Their operation was moderately purgative, accompanied with nausea, vertigo, a copious perspiration, and much discharge of wind.”

* Bell's Surgery, vol. I. p. 162.

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In obstinate Ulcers.

The dried leaves of tobacco, steeped in water and applied to the parts affected, have sometimes been attended with beneficial effects.

Mr. William Bartram informed me, that he knew of several long standing ulcers, after having resisted the usual remedies, that were entirely cured by the use of tobacco, in the manner above specified. Doctor Earle, of Maryland, communicated to me the case of a child, who had been for several months afflicted with an obstinate eruption on its head, which evaded the skill of several eminent physicians, that was ultimately cured by an old woman, who daily dressed it with an ointment of tobacco, previously washing the part with a decoction of the same.

In the Itch.

This fulsome disorder has frequently been cured by the application of tobacco to the affected parts. Mr. Jacobs, a gentleman from Paris, informed me, that the French physicians, make great use of the tobacco wash * in obstinate

* The wash is prepared in the following manner.

To one pound of the dried tobacco leaves, add four quarts of water; let these boil slowly over a gentle fire, for the space of half an hour, then pour off the liquor, and add to it one ounce of soda or mineral alkali. The parts affected are to be well rubbed with a sufficient portion of this mixture, and to be continued from one to three weeks, according to the virulency of the case. Though it must be remarked, that, in consequence of the irritability of many constitutions, great caution is requisite, with respect to its use, as it has, in some instances, occasioned vomiting, and sometimes convulsions.

cases of cutaneous eruptions. The same, he avers, seldom fails of curing the itch: the eruptive parts are to be washed three or four times a day, until every appearance subsides; in this way radical cures have been effected, even after the disease had resisted the most powerful medicines.

A strong decoction of the stalks with sharp-pointed dock and alum is said to be of good service, used externally, in cuticular distempers: this is also said to be infallible in curing the mange in dogs.*

In Phtheiriasis.

This is a *lousy* distemper, to which most children are generally subject, adults also at times, are afflicted with it. Moist and warm situations promote the increase of these detestable vermin; but a cold and dry one very soon exterminate them. Four species are peculiar to the human body, viz. 1st. The *pediculi*,† so called from their being more troublesome with their feet, than from their bite. They generally infest the head, particularly if sore.

2d. *Morpiones* or Crab-lice. They are thus called from the analogy which they bear to a crab-fish. 3d. Body-lice. These are generated in the apparel of the filthy. 4th. A species which breed under the cuticle, and are called by some

* The New Royal Encyclopedia, by George Selby Howard.

† A gentleman informed me, that when young, he was neglected by his attendants, and for a time was much afflicted with the first and third species of these fulsome vermin, which occasioned obstinate eruptions, in his head, and on various parts of his body. Many

authors, *cyriones*. They are of a round form, extremely minute, and are generally found in the hands and feet. By creeping under the scarf-skin they induce an intolerable itching, and when the skin bursts where they lodge, clusters of them are found deposited in a small concavity.

A good diet, and attention to cleanliness contribute much to the destruction of these fulsome vermin. Mercurial ointment, and a solution of corrosive sublimate are held in the greatest estimation; but I have heard of instances, where these have failed, and an infusion of tobacco,* perfected a radical cure.

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medicines were tried for his relief, but without any benefit whatever. Recourse was then had to a strong decoction of tobacco, which was applied three or four times a day, to the parts affected, and in a fortnight or three weeks he was radically cured.

* It may here be necessary to remark that, I have often heard it asserted that, the tobacco decoction proves very destructive to flies, when sprinkled about a room. The same is corroborated in the *Theatrum Botanicum*, where the author observes, that a decoction of tobacco was frequently made use of for the purpose of destroying flies.

Doctor Shannon asserts that, there is a large fly in some parts of Africa, that produces often a dreadful disease, by depositing its ova in the mouth or nose.

It happens frequently to negroes, and there are several examples of it among the common soldiers. While they are sleeping in the open air, the fly deposits its ova most commonly in the nose, but sometimes in the mouth. The pain, swelling, and inflammation about the face, after the maggots are formed and ready to break forth, are very great, and the poor sufferers are almost distracted. The number of living maggots that come away, is often considerable, and they are of a large size, being nearly half an inch long. The usual remedy in such cases is, inhaling the steam of a strong decoction of tobacco through the mouth and nose, according to the seat of the disease; it procures relief: perhaps washing the mouth and syringing the nose, might be equally or more effectual.

See Shannon on medicine. p. 382.

Errhines.

These are medicines which excite a preternatural discharge from the mucous follicles of the Schneiderian membrane upon the internal surface of the nose, and adjacent concavities; by which they frequently relieve rheumatic congestions, and particularly violent tooth-ach. As an errhine, the tobacco powder, commonly called snuff, has been long in great repute: its use is frequently practised, and has been strongly recommended for the relief of head-ach, pains of the ear, and ophthalmias. Its salutary influence in such affections is sufficiently confirmed by the pains again recurring as often as its use was suspended for a day or two.

How far the effects of errhines may extend, says Dr. Cullen, cannot be exactly determined; but it is probable, that they may operate more or less on the whole vessels of the head, as even a branch of the internal carotid passes into the nose: and independent of this, it is not improbable that our errhines may have been of use in preventing apoplexy,* and palsy; which at least is to be attended to so far, that whenever any approach to these diseases is suspected, the drying up of the mucous discharge should be attended to, and, if possible restored.

As much virtue has been attributed to nicotiana, in expelling worms, I made the subsequent experiments, with a view to elucidate an interesting subject, and to ascertain the foundation for such an opinion.

These experiments were made with accuracy; and in my opinion substantiate the anthelmintic powers of this plant.

* Cullen's materia medica, vol. 2. page 295

Exp. 1. I immersed a common worm,* taken out of the earth, into a small quantity of the tobacco infusion,† and in three minutes it became convulsed, which continued for the space of twelve minutes, but at the expiration of fifteen minutes, no symptoms of life were discernible.

Exp. 2. Ten grains of calomel were suspended in a small quantity of water. Another worm of the same species was introduced into this mixture, which was considerably affected in three minutes, in ten still more so, in fifteen began to subside; in thirty it remained perfectly dormant.

At the expiration of an hour, still alive, but continued inactive, unless disturbed.

Exp. 3. In a solution of white sugar I introduced another worm, as above; it was convulsed in five minutes; in ten these symptoms were somewhat diminished; in fifteen remained quiet at the bottom of the vessel, and in forty it appeared perfectly inanimate.

Exp. 4. In the distilled water of tobacco, which was extremely pungent, I immersed another worm, which almost instantaneously contorted itself into a variety of forms, exhibiting strong marks of violent pain, and in the short lapse of three minutes it expired.

Exp. 5. Five grains of corrosive sublimate, dissolved in water, produced convulsions in two minutes, and a torpor in twelve.

* I selected this species of worm for my experiments, in consequence of the analogy which exists between it and that generated in the human system.

† One drachm of the dried tobacco leaves was infused in an ounce of water, for the space of twenty-four hours, after which it was filtered off.

Exp. 6. Molasses produced convulsions in five minutes, and inactivity in twenty-five.

Exp. 7. A strong decoction of pink root, brought on convulsions in seven minutes, and a torpor in thirty.

We find, from the several preceding experiments, that tobacco, as an *anthelmintic*, is deserving of being held in high repute.

Several of the most powerful medicines, whose virtues as a vermifuge, are in the greatest estimation, appear to be but feeble in their operation, when compared with the great influence of tobacco in the expulsion of worms.

The celebrated *Spigelia Marylandica* of Linnæus, it must be acknowledged, is very generally destructive to worms; but, agreeable to the first and seventh experiments, under the head of anthelmintics, we find that tobacco appears to be more instantaneous in its operation, though, perhaps ultimately, not more effectual. Yet, from its more immediate effect on those animals, I should rather presume, that it merits the particular attention of physicians, as a valuable medicine, and that, on this consideration, it would, unquestionably be expedient to give it repeated trials in those cases, which may resist the more feeble operation of other anthelmintics.*

* Dr. Shannon,† after enumerating several diseases peculiar to the Africans, observes, that the *Guinea-worm* is another evil attendant on the negroes in Africa, and is generally cured by anthelmintics.

It may be just, therefore, to infer, that *the tobacco infusion* may be administered with very good effect.

† Shannon on medicine. p. 380.

As a Cathartic.

In cases of constipations of the abdominal viscera, the infusion of tobacco has sometimes been administered, and often with immediate relief by occasioning a speedy expulsion of the obstructing indurated fœces. The smoke,* says Dr. Cullen, thrown up the rectum, will operate in like manner, and has proved beneficial, after the failure of many violent cathartics; it enters much further into the intestines than injections commonly do, and is thereby applied to a larger surface, by which means it may be rendered much more powerful than the infusion.

It is to be regretted, says Dr. Fowler, that injections of tobacco are not in more general use, for I am thoroughly persuaded, that in cases of the colic, they would prove more successful than any other kind with which we are acquainted.

From the many facts and observations which I have hitherto adduced, relative to the medicinal influence of tobacco, it is, doubtless, reasonable to infer, that it may prove efficacious in many diseases,

* A gentleman of my particular acquaintance informed me, that he was not in the habit of smoking much, but whenever he was troubled with any degree of costiveness, it was only resorting to a segar to obviate this inconvenience, which never failed of acting as a lenient purgative, and imparted immediate relief. This method he preferred to the taking of physic, as it was mild in its effects, and left his body agreeably composed.

If the generality of persons were to relinquish the perpetual use of this plant, and only to have recourse to it for its medicinal virtues, when necessity demanded, is it not more than probable, that many diseases may be eradicated, or at least their violence mitigated by its salutary influence?

That it is of great service in dropfical affections, has been clearly demonftrated; and, in cafes of dyfury, it has, in many instances, proved falutary, by fuccefsfully promoting a copious difcharge of urine. In fhort, much may be faid of its virtues as a medicine, but as it is not my wifh to prove prolix, by profufely extending encomiums on an indigenous plant, fo univerfally known, I fhall conclude by obferving, that the errors and imperfections of this effay, are, no doubt, eafily difcernible: but, at the fame time, I am buoyed up, with the flattering idea, that the candid reader will readily excufe a juvenile attempt.

As an expanded field lies open before us, for investigation, I would wifh, that the fubject might be hereafter taken up, by fome more adequate experimentalift, as I am perfuaded that the complicated operative effects of tobacco on the human fyftem, would render it an invaluable medicine in many obftinate difeafes.



ERRATA.

- In Page 8, line 2, for interior, read anterior.
 18, 2, from the bottom, for exorbitant, read exorbitant.
 24, 11, for langour, read languor.
 34, 6, for stimuly, read stimulus.
 38, 6, for cuds, read ends.
 55, in the bottom, for pages 32 and 33, read 25 and 26.
 77, 4, for *obstructing*, read *obstructing*.

